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THE ORGANIC SIDE OF GEOGRAPHY: ITS NATURE AND LIMITS*

BY

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At the outset the writer is disposed to adopt a sentiment expressed by H. R. Mill in his presidential address to the Geographers of the British Association,—"Discussion rather than acceptance is the best fate that can befall any attempt at stating scientific truth."

It is not proposed here to define geography. Attempts to form a complete and logical definition often result in mental confusion and unprofitable hair-splitting. The topic concedes an inorganic side of geography which is truly geographic. If relation between inorganic and organic is the only genuine geography, then physical geography, so-called, is all astronomy, geology, physics, meteorology and oceanography. But the physical and the organic are co-ordinate parts of geography and both distribution and relation belong to its concept, freely conceding that the highest synthesis of material and the chief goal of study lie in the field of relation of the earth to life and pre-eminently in the bond between man and his total environment.

The preliminary suggestion of the President of the Association, looking toward this conference, proposes "The organic, especially the human side, to discuss how far we ought to go in that direction, where useful limits may be set, also to indicate the kind of work on plants, animals and man that is truly geographic and not either botanic, zoölogic or historic."

If we should try to mark off strictly the boundaries between geography and these other sciences, I think we should find warrant in the above proposal, but I have some fear that we should not be able to see the woods for the trees. It is still left to us to find "how far we ought to go and where useful limits may be set." In his presidential address at our second annual meeting Professor Davis named three possible alternatives: (1) that the organic be left to the biological sciences and to history, (2) that the more manifest relation of organic forms be adopted into geography, (3) that we include all, even minute ontographic responses. He adopts this third alternative as essentially the position of Ratzel and Reclus, and cites as an example the overlapping of geography and philology in the field of names and terms used by man. Now, this seems to be for the geographer who is learned in philology or is willing to make a laborious journey into the philologist's field. Sound judgment and the measurement of one's powers are desirable, and I incline to the view that most of our work should follow the second alternative, dealing chiefly with unmistakable and commanding relations; in other words, setting "useful limits" in our traverse from the geographic toward the organic center. It will take a long time to delimit and systematize the material of geography and its full organization and definition will come gradually, if at all, as the outcome of many attempts in its several fields. Reclus has characterized the ethnologists as "squatters in the Far West of learning—they erect no structures which pretend to more than a provisional character." In the far future may come "stately edifices of marble." Notwithstanding the age and dignity of geography, some parts of our science are thus provisional, and we should move with deliberate steps. Meanwhile, there is enough ground for every ambitious geographer, ground which he alone is likely to explore.

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* Read in opening a round table conference of the Association of American Geographers, Boston, Dec 31, 1909.

The aims in this discussion are therefore practical rather than theoretical. We should aim at the best available conception of the earth and its life which is possible to the present generation. Such an attitude does not surrender fundamental problems as insoluble, but faces us most directly toward the broad and deep geographical philosophy which we desire for the future. And it must further be said that the rule of reserve and common sense does not bar out daring excursions for those who are able to make them, but we shall at the same time not lay ourselves open to the charge of making an indiscriminate raid into the fields of the organic sciences.

We will test our conceptions of what may be practicable geography in relation to several organic fields. Professor Clements in his Plant Physiology and Ecology gives the following as the factors of a habitat,—water, soluble salts, humidity, light, temperature, wind, soil, pressure, physiography, gravity, polarity and biotic factors. Geography unquestionably has to do with some of these factors, perhaps with all. But some, such as light, pressure, gravity and polarity, indeed all the factors in some of their special functions, must be left to the investigators in structural and physiological botany. The future, indeed, may develop generalizations which shall take their place in Geography. Some principles are already available. The plant life of the globe offers a major geographical fact, as also many subordinate divisions of it, as related to land regions, water, climate. Here may also be classed such groups as hydrophytic, mesophytic and xerophytic societies, all depending on more or less abundant supplies of water. The supply of water is in turn dependent on meteorological and physiographic conditions, including the broad relations of continents, oceans, lakes, rivers and ground waters. Or, we may analyze, for example, the hydrophytes, and find free-swimming, pond and swamp societies, or follow the swamp groups and find reed swamps, swamp moors, sphagnum moors and swamp forests. This all sounds very geographic and studies of this sort are essential to even the broadest correct knowledge of the plant world, and thus become indispensable to our work in regional and economic Geography.

Next rises the question, who shall make such ecological study? Obviously, not the ethnographer or the meteorologist, but the botanist, and when the botanist does it he is working common ground, and it really makes little difference whether we call him a botanist, a geographer, a geographic botanist, a botanical geographer, or an ecologist. The essential is that the work is done and that its results are available to the biological specialist on the one hand and to the geographer on the other. The botanist may use the product as subsidiary to plant physiology and the geographer may find aid in understanding the distribution or industries of man, or as helping to form that great synthetic conception of the earth for which he is ever striving.

A similar inquiry relates to geo-zoölogy. Here arise abundant examples of geographic subjects. One of the chief of these is the distribution of animals. Shall the expert in this field be a zoölogist or a geographer? Perhaps he must be both. The answer to this query, in like manner, need not be considered as material. Insect and germ life in relation to public health offers another and specially important example, not only for tropical but for the temperate latitudes. Here the expert must be medical, and he must be trained in biological investigation. Must he be also a geographer? It would appear to be a gain if he is such, but if he is not, how much of his product belongs to geography? Must not the geographer, even though a layman to biological study, find some approach to this domain, and make use of its products? Certainly, the subject will become essential to general education, and geography seems to be the only school subject which can give it a place. A third example is taken in animal life as related to agriculture and to food. Here is a recognized department of commercial geography, and geography should go farther than it now does in the recognition of importations and economic culture of animals, and in taking account of game protection and the control of disease.

On the other hand, vestigial organs in man, the origin and use of the glands of the stink bug and the evolution of the notochord are clearly subjects for zoölogists,—though even here a fundamental law may yet be made out, so general and so important as to demand a place in geography. If zoö-chemistry is nevertheless chemistry, zoö-geography may surely be considered as geography. It would certainly require a chemist to work in the one field and it does not seem that a zoölogist who is ignorant of geography could achieve in the other. The man who is more zoölogist and less geographer, and the man who is more geographer and less zoölogist would both be capable of certain work. The geographer in the organic field is certainly a geographer by virtue of the relation which he establishes between the physical and the organic.

There remains the still more important field of anthropogeography. The range of human sciences and arts to which geography may claim a working relation is debatable. We begin at one end of the line where there is no question of right and proceed toward the fields which are more doubtful, or in which, at least, no safe lines have been drawn.

Haberlandt defines ethnography as descriptive ethnology. "It imitates the system pursued in the geography of plants and animals and keeps strictly to the divisions of the earth and their natural configuration, which correspond in the main with the fundamental divisions of the human races inhabiting them." This author makes three groups of factors in the development of man: external, internal and social. Of these the external factors at least cannot be other than geographical.

According to Reclus, we often compare ethnography and ethnology, but "if a distinction is to be made between them, an instinctive perception teaches us to speak of ethnographic facts and ethnologic theories, ethnology being related to ethnography as the wine is to the grape." These words were written many years ago, and would seem to emphasize the mere description and distributional phases more than is consistent with the ideals of the new geography. Must the geographer have nothing to do with the wine? In so far as physical influence has shaped races, their bodies, homes, tools and customs, the geographer has at least some rights in the field. Perhaps the ethnologist will bear the brunt of the investigation, but his broader results are common property with the geographer and the geographer must supply the physical data which the ethnologist requires.

In approaching history it will promote clearness to observe at least three types of view as regards its relation to geography. To begin at one extreme, the present writer has elsewhere quoted such views as,—"man is what he eats," "character is a function of latitude," and, "history is nothing more than an echo of the operation of geographic laws." If these views were true, history would have to be classed as a mere province of geography, and, in theory at least, the expert geographer ought to be able to reconstruct history from the data at his command. Comment on a similar view is thus made by Reclus, and in so saying he draws a broad moral for overambitious geographers: "There is some truth in Buckle's statement that the history of the most civilized nations may be explained by the chemical constituents of their food, but until the action of aliments on bodily and intellectual organism is better known the discussion would be premature."

There is an opposite extreme. Professor G. L. Burr, in discussing a paper read by Miss Semple before the American Historical Association, argues that geography, while a factor, is only one factor. This, of course, all would concede. But he proceeds to urge that man is the more active factor, and that "we must not impute action or causation to things that are inert. This is a figure of speech which gives vigor to style but always involves fallacy." So far as we take this literally, we still must all agree. But possibly a fallacy lurks beneath the charge of fallacy. When the geographer finds a thing, or a group of things, in the field of land form, or in the realm of the atmosphere, or in the under earth, or in the heavens above, whose existence, or contact, or presence, have led to human action or movement of a given sort, is he estopped from saying that these things have *influenced* human life? This seems a sober and ordinary use of the mother tongue, and the geographer knows as well as anyone that a human volition stands between physical things and the current of man's action which we call history.

A more explicit expression of this extreme view is here cited from Mr. J. B. Bury in an essay on Darwin and Modern science:

"Environment and climatic influences must be called in to explain not only the differentiation of the great racial sections of humanity but also the varieties within these subspecies, and, it may be, the assimilation of distinct varieties. Ritter's anthropology has opened a useful line of research. But, on the other hand, it is urged that in explaining the course of history, these principles do not take us very far, and that it is chiefly for the primitive, prehistoric period that they can account for human development . . . . that physical environment has ceased to act mechanically, and in order to affect their activities, must affect their wills first, and that this psychical character of the causal relation substantially alters the problem . . . . Most thinkers agree now that the chief clews to the growth of civilization must be sought in the psychological sphere."

Our only comment on this view must be this,—if environment is so powerful to form races, why not to influence them in their maturer development? And by what right do we assume that psychological conditions and resulting actions are something apart from and above environment and in no way historically and genetically related to it?

A third and more reasonable view, which may be called intermediate, is formulated by the historian and statesman, James Bryce,—"Geography has to look upon man as being a natural growth who is conditioned in his development and progress by the forces which nature brings to bear upon him. He is in history the creature of his environment, not altogether its creature, but working out also those inner forces which he possesses as a rational and moral being, but on one side, at all events, he is largely determined and influenced by the environment of nature . . . . man in his early stages is at the mercy of nature. In process of time he learns to raise himself above her. It is true he does so by humoring her, so to speak, by submitting to her forces. *Natura non nisi parendo vincitur.*"

This statement appears to do justice to all the elements concerned, whether looking at nature or man, at primitive or advanced culture. We need not ascribe anything like volitional initiative in order to credit environment with a strong force in shaping the current of human life. If the substance is there, the fallacy lies in trying to dodge it. If a great body of essential truth is found in a common field, it is a waste of time for the geographer and the historian to wrangle for the possession of it or for some particular designation of it. It is better to cultivate the ground and reap the mutual benefits of it, a history made concrete and rational and a geography enriched by themes of the highest interest.

Granted that there is a generous overlap of the two subjects, what, precisely, is the geographer's function in the case? If he enters the field of history at all, even on what he thinks is a geographic errand, ought he to turn back, on the more or less current supposition that "a man cannot know anything about a subject unless he knows nothing about any other"? This in no degree represents the general attitude of historians. Indeed, Ripley characterizes Freeman and Bryce as "apostles" of the new emphasis on environment and cites Winsor's Mississippi Valley as another great example. I see no reason why we should not accept for history the principle which Ratzel lays down for ethnographical study, that "the geographical conception of their surroundings and the historical consideration of their development will thus go hand in hand."

As to the actual division of labor, no line can be drawn. From either side it is possible to wander across the boundary, according to the bent of the individual worker. It will fall to the geographer to put in order the physical data, and to the historian will surely remain, as ever, the growth of law, constitutions and political systems and the development of states with their corporate life. But there is another group of themes, as, for example: our progressive knowledge of the globe and its historic availability to man; the relations of major regions to each other and to embracing seas; races or nations in reference to the homes that have molded them; the chain of influence that extends from resources to occupations and from occupations to character; all military operations; the position and influence of lines of migration and transportation; the distribution of population; the fixing and unfolding of centers of industry. Here is a continental opportunity for the geographer and the historian, each to show due reserve, each to enrich the labors of the other, and each able at any moment to retire into fields of research where the other would not think of following him. If geography is ever to push farther into the psychical-historical realm, it will then have demonstrated its right to be there, but this is a problem for the future.

An examination of some standard texts of economics for their scope and content will not be without profit. According to Hadley, economics deals with a nation's commerce and finance. This looks as if commerce belonged to economics and not to geography, but a further look shows that capital, money, credit, profits, wages, labor and revenue are the typical themes of the economist. Walker's main divisions are: production, exchange, distribution, consumption. These sound geographic, but on examination we find labor, capital, etc., but nothing approaching the geographic conception of production and products. So exchange has to do with money, and distribution with rents, interest, profits and wages. Ely refers to chemistry, psychology, mathematics and the social sciences as related branches of knowledge, and he has a paragraph on "our environment" which closes by turning over the "economic significance of our physical environment" to the economic geographer. He also gives a short chapter on the economic development of the United States, with brief passages on natural resources, agriculture, manufactures and transportation.

Bullock sketches our economic history before taking up economic theory and in so doing touches such geographic themes as the fur trade, cattle raising, agriculture, fisheries and mining, which he calls foundational industries. He has also a chapter on manufactures, transportation, ship building, textiles, iron and steel.

On the whole, while some, perhaps all, of the economists appreciate the value of basal geographic studies, they would seem to leave the whole field open to the geographer, a field unlimited and largely untested in its educational and practical value and possibilities. No geographer need sigh for doubtful excursions into remote territory, while this field, so close to the earth, so close to man and so full of environmental relations, is at his door and is, in effect, all his own.

If geography is basal to economics and is part of the very structure of history, it cannot escape a relation to sociology, a relation so deep and pervading that it cannot be overlooked. I quote a single illustration, drawn from Ripley in his discussion of the racial geography of Europe. He meets the argument that certain social phenomena, as divorce and suicide, seen in France, are racial. "Our theory, then, is this, that most of the social phenomena we have noted as peculiar to the areas occupied by the Alpine type are the necessary outcome, not of racial proclivities, but rather of the geographical and social isolation characteristic of the habitat of this race. The ethnic type is still pure for the same reason that social phenomena are primitive. Wooden ploughs pointed with stone, blood revenge, an undiminished birth rate and relative purity of physical type are all alike derivatives from a common cause, directly physical and coincidently social. We discover primarily an influence of environment where others perceive phenomena of ethnic inheritance." By a similar argument he urges that divorce and suicide, which are uncommon in the Alpine regions and are common in the densely populated region of commingled races of which Paris is the center, are not matters of race, but follow ultimately upon conditions of environment. Such views, if true, or if partially true, offer a field for geographic investigation. If tilled by a sociologist, he must go back of statistics and economic conditions and know the physical environment in relation to society,—he must become in fact a geographer.

By technology we mean the methods and instruments of the useful arts. How far can we study them as a part of geography? They certainly belong largely to physics and chemistry. Let us take for example the technology of iron.

Iron relates itself to economic geology, in the mode of occurrence, origin and amount of ores, their composition and qualities. Already we have invaded the province of chemistry. Economic geography takes heed of another group of facts, the distribution, national or worldwide; of transportation routes, manufacturing centers and markets. Roughly, there stands between these two groups a variety of technological processes, of mining and handling, of smelting, steel making, steel working, all depending ultimately on mechanics and chemistry, but distinctly human in their relationship. How far are they geographical? Take the basic process. Is an account of it *per se* geographical? No. But a general knowledge and reference are geographical if its adoption should make a great country, as Canada, a foremost producer, when it was not before. We observe also the migration and expansion of the iron industry by the passing of charcoal and the adoption of coal. Likewise the use of charcoal in Sweden is a geographic fact pointing to paucity of coal and to the yet abundant forests of that country. Geography, therefore, especially geographic education, is bound to step broadly across the field of geology and technology in order to reach with sure bearings its own proper territory. And when it has arrived at its own goal, it will find itself close to economic and sociological considerations which can never be far away from so vast and highly organized and highly capitalized an industry as iron represents today. We take another example, wheat. Such considerations as latitude range, climatic and soil conditions, transportation, primary and ulimate markets, are distinctly geographical aspects. But there is a technology of wheat involving the steam plow, the harvesterthresher, elevator construction and operation, modern machinery and methods of milling. These appliances and processes are mechanical, not geographical, but they and they alone have rendered possible the vast expansion of wheat and made it the bread of nations. Hence these processes have a geographic relation. The geographer will not investigate the processes to minute detail, nor become an inventor of technical methods, but he cannot omit them from his circle.

Wheat, like iron, illustrates the manifold intersection of all circles of knowledge and activity; for further, it has a history, which belongs both to botany and to general history. It is the subject of refined experiments in breeding, in which it is, indeed, botanical, but is also geographical, as when a wheat from an altitude of 11,000 feet in northern India, and a wheat from a high latitude in Russia are brought to Ottawa and crossfertilized, to make an early ripening wheat that will extend wheat culture into the basin of the Mackenzie River.

The qualities of wheat carry us into the domain of nutrition and physiology, but may involve a geographical relation, as when a macaroni wheat is imported from Russia, grown on our Great Plains, and returned by millions of bushels to make the bread pastes of France and Italy. And we need but mention the wheat pit, the railroad and the farm mortgage, or see a Winnipeg bank sending out its daily bundles of currency to move the crop of the Canadian Northwest, to find the relation of wheat to economics, and to see it as the engine of civilization and the opening wedge of history over half a continent.

Cotton and many other products would show the same relation of geography to technology and a similar complex of ties binding it to manifold fields of knowledge and research. But we may challenge any or all of these related themes to take up and co-ordinate all the parts of the great whole as geography is privileged to do.

Such examples, I grant, seem to bear out the view of Mill that geography is "to co-ordinate and correlate all the special facts concerned so that they may throw light on the plan and the processes of the earth and its inhabitants," and is not concerned with the processes of the special sciences. Does this destroy the idea of original research in organic geography and make it a sort of secondary science? I do not think this a fair inference. We might as well charge philosophy with being superficial because it aspires to unify and rationalize all knowledge. Rather adopt the view of Ripley that geography has made good its claims, "until to-day geography stands ready to serve as an introduction as well as a corrective to the scientific study of human society." What now if the deep researches in the atmosphere are made by the meteorologist and he prefers to be called a meteologist? And suppose the human relations and principles are developed chiefly by the ethnologist, the historian and the sociologist, they using the materials made ready by the physiographers, meteorologists and by their fellow humanists. Does it turn out that geography itself offers no field of research, but may only use second-hand the treasures of more fortunate investigators? Are we thus left without a science? Let us see.

Most of the members of this association are well centered, in biological science, in meteorological science, in geomorphology, in ethnology. I think we are not favored by the membership of anyone who counts himself a historian. And suppose these men are willing to be counted also as geographers, and hold out their hands toward a great common ideal, that unifying grasp of the whole globe and its life which is more than any one science. Is not this enough? Every man has his special field of detailed research. And every man tests and broadens his knowledge by coördinating it with related truth.

And who can doubt that on such foundations, the master mind or minds will arise to construct a more lofty conception of the machinery and life of the globe? This would be the higher justification and apotheosis of the science of geography.

A NIGHT AMONG WILD ANIMALS*

"As game was plentiful at Serah, and there was only one waterhole for the animals to drink from, I thought to myself that this would be an excellent place to make observations by night. I therefore had a boma [inclosure] made close by the spring so that I might sit and watch the various beasts in the brilliant moonshine as they came to quench their thirst. I had the camp purposely

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* The BULLETIN referred, in its review of Lieut.-Col. Patterson's book "In the Grip of the Nyika," to the night that he spent in hiding at a solitary waterhole where many species of animals came to drink. Through the courtesy of the Macmillan Company, publishers of that work, the BULLETIN is permitted to print here the author's brief and graphic description of what he saw while lone with the wild life of tropical East Africa.